

Listing of Claims:

Claims 1-43 (Canceled).

Claim 44 (Currently Amended): A three-dimensional display device comprising:

 a phantom three-dimensional display device for displaying a phantom three-dimensional image comprised of an aggregation of depth sampled images; and

 a shutter device having a plurality of shutter elements ~~formed by a shutter element~~ for controlling a light transmittance, ~~said shutter device being located at a position where said phantom three dimensional image is reproduced or a position optically equivalent to said position~~

wherein the shutter elements are arranged at positions where the depth sampled images are displayed in a depth direction, and each of the shutter elements are controlled in a time division manner respectively so as to vary the light transmittance.

Claim 45 (Currently Amended): A three-dimensional display device as set forth in claim 44, wherein said shutter ~~element~~ elements are two-dimensionally divided in a plane perpendicular to the depth direction, and each of divided regions are driven independently of the other.

Claim 46 (Currently Amended): A three-dimensional display device as set forth in claim 44, wherein ~~said~~ a predetermined shutter element lowers a light transmittance in the region of the depth sampling sampled images as two-dimensional images ~~of said phantom image at said shutter element position during a time duration that said phantom three-dimensional image is being reproduced on the other side of said shutter element as~~

~~viewed from the observer~~ at the positions of the shutter elements when the depth sampled images are displayed in the depth direction in a time division manner.

Claim 47 (Original): A three-dimensional display device as set forth in claim 44, wherein the material of said shutter element is one or combination of guest-host type liquid crystal containing diachronic dye having a different light beam absorption depending upon an orientation of molecules and liquid crystal having dielectric constant anisotropy, polymer dispersion type liquid crystal containing droplet-like liquid crystal in polymer, polymer dispersed liquid crystal containing a polymer network in liquid crystal, a holographic polymer dispersed liquid crystal having a layer structure of polymer dispersed liquid crystal containing droplet like liquid crystal in polymer and polymer, a holographic polymer dispersed liquid crystal having a layer structure of said polymer dispersed liquid crystal containing a polymer network in the liquid crystal and polymer, and a polymer dispersed liquid crystal wherein said liquid crystal in said polymer dispersed liquid crystal is said guest-host type liquid crystal.

Claim 48 (Original): A three-dimensional display device as set forth in claim 44, wherein said phantom three-dimensional display device is constructed with a two-dimensional image display device and a varifocal optical device.

Claim 49 (Currently Amended): A three-dimensional display device comprising:
a phantom three-dimensional display device for displaying a phantom three-dimensional image comprised of an aggregation of depth sampled images; and
a shutter device having a plurality of shutter elements ~~formed by a shutter element~~

for controlling a light transmittance,

~~said phantom three dimensional image being a real image, and said shutter element being a photoreactive element for lowering a light transmittance in a real image region at the position of said shutter element in accordance with an imaging light beam of said real image~~

wherein the shutter elements are arranged at a real position according to a depth position where the depth sampled images are displayed as optical real images, and the shutter elements are photoreactive elements for lowering a light transmittance in a region of the depth sampled images at the positions of the shutter elements according to the real position.

Claim 50 (Original): A three-dimensional display device as set forth in claim 49, wherein a material of said photoreactive element is one of a photochromic material, a material consisting of a material causing a photostructural change and liquid crystal, and a material having a nematic-anisotropic phase transition temperature to be varied by photostructural change.

Claim 51 (Original): A three-dimensional display device as set forth in claim 49, wherein said phantom three-dimensional display device includes a two-dimensional image display device and a varifocal optical device.

Claim 52 (Currently Amended): A head-mount display device comprising:

two display devices corresponding to left and right eyes ~~and each including~~
wherein each device includes a two-dimensional display device and an optical device

having a variable focal length; and

a control device for controlling said two-dimensional display device and said optical device having a variable focal length,

wherein the control device controls the display and optical devices so that the focal lengths of the optical device are focused on the positions of the depth sampled images, and

said display devices ~~being~~ are mounted to left and right eyes, and said control device synchronously ~~driving~~ drives said two-dimensional display device and said optical device to perform three-dimensional display.

Claim 53 (Currently Amended): A head-mount display device ~~as set forth in claim 52, comprising:~~

two display devices corresponding to left and right eyes wherein each device includes a two-dimensional display device and an optical device having a variable focal length; and

a control device for controlling said two-dimensional display device, said optical device having a variable focal length and ~~wherein said optical device further comprises a~~ deflection device for varying a direction of a light incident to said optical device,

wherein the control device controls the display and optical devices so that the focal lengths of the optical device are focused on the positions of the depth sampled images, and ~~said control device~~ controls said optical device in such a way that when the image is moving closer to the eyes according to a change of the focal length, the overall display image of said two-dimensional display device is deflected to be closer toward the center between the left and right eyes.

Claim 54 (Currently Amended): A head-mount display device ~~as set forth in claim 52, comprising:~~

two display devices corresponding to left and right eyes wherein each device includes a two-dimensional display device and an optical device having a variable focal length; and

a control device for controlling said two-dimensional display device and said optical device having a variable focal length,

wherein the control device controls the display and optical devices so that the focal lengths of the optical device are focused on the positions of the depth sampled images,

wherein said optical device has a transparent material, ~~of one of forms of a fixed focus lens shape, a fixed prism shape, and a shape where the fixed deflection mechanism is incorporated into the fixed focus lens or a combination thereof,~~ a layer including a variable refractive index material, and at least a pair of transparent electrodes for sandwiching said layer, and

wherein the transparent material is comprised of one of forms of a fixed focus lens shape, a fixed prism shape, and a shape where the fixed deflection mechanism is incorporated into the fixed focus lens.

Claim 55 (Original): A head-mount display device as set forth in claim 54, wherein said variable refractive index material is liquid crystal having dielectric constant anisotropy and refractive index anisotropy.

Claim 56 (Original): A head-mount display device as set forth in claim 55, wherein said variable refractive index material is liquid crystal having dielectric constant anisotropy and refractive index anisotropy, and being dual-frequency liquid crystal having a different physical property having a different sign of a difference in a dielectric constant corresponding to orientation of the liquid crystal molecules between different frequencies f_1 and f_2 .

Claim 57 (Original): A head-mount display device as set forth in claim 54, wherein said variable refractive index material is polymer dispersed liquid crystal, and the droplet size of the liquid crystal, or the droplet size of the polymer is smaller than a wavelength of visible light.

Claim 58 (Original): A head-mount display device as set forth in claim 54, wherein said fixed focus lens is spherical or non-spherical single lens or fresnel lens.

Claim 59 (Original): A head-mount display device as set forth in claim 54, wherein said fixed prism is simple prism or a multi-prism having an array of a plurality of fine prisms.

Claim 60 (Original): A head-mount display device as set forth in claim 54, the form where said fixed deflection mechanism is incorporated in to said fixed focus lens is in the form of increasing or decreasing an angle formed by a spherical or non-spherical simple lens or a fresnel lens and an optical axis.

61 (Original): A head-mount display device as set forth in claim 52, wherein said driving device sequentially applies voltages V_1 to V_N having primary frequencies f_1 to f_N ($N \geq 2$) to said transparent electrodes for a predetermined period of time and at a predetermined interval.